## NORTH PACIFIC OCEAN, SEPTEMBER 1935

By WILLIS E. HURD

*Atmospheric pressure.*—Owing to the passage of a number of low-pressure areas across northern waters of the North Pacific Ocean during September 1935, the Aleutian cyclone showed considerable intensity, as indicated by the average pressure, 29.77 inches (practically normal), at Dutch Harbor. Despite this development over the eastern Aleutians, pressures were approximately 0.10 inch above normal at St. Paul Island and over most of the Gulf of Alaska.

Anticyclonic conditions prevailed off the Washington and Canadian coasts and extended thence southwestward nearly to Midway Island, although broken at times by depressions from the northward.

Over most of the islands of the Far East, except the Nansei Group, pressures were below the normal for the month; and at Guam, Manila, and Chichishima, were the lowest in several years of record for September.

TABLE 1.—*Averages, departures, and extremes of atmospheric pressure at sea level, North Pacific Ocean, September 1935, at selected stations*

| Station | Average pressure | Departure from normal | Highest | Date | Lowest | Date |
|---|---|---|---|---|---|---|
| | *Inches* | *Inch* | *Inches* | | *Inches* | |
| Point Barrow | 29.88 | −0.02 | 30.44 | 8 | 29.12 | 26 |
| Dutch Harbor | 29.77 | +.01 | 30.44 | 17 | 28.68 | 25 |
| St. Paul | 29.80 | +.09 | 30.42 | 17 | 28.76 | 30 |
| Kodiak | 29.84 | +.13 | 30.34 | 7 | 29.04 | 25 |
| Juneau | 29.98 | +.06 | 30.32 | 24 | 29.38 | 14 |
| Tatoosh Island | 30.01 | +.01 | 30.30 | 16 | 29.54 | 15 |
| San Francisco | 29.92 | −.02 | 30.11 | 15 | 29.76 | 17 |
| Mazatlan | 29.82 | .00 | 29.90 | 20 | 29.74 | 24 |
| Honolulu | 29.96 | −.04 | 30.02 | 7 | 29.84 | 27 |
| Midway Island | 29.98 | −.03 | 30.12 | 8, 9, 10 | 29.74 | 17 |
| Guam | 29.74 | −.09 | 29.84 | 3 | 29.60 | 22 |
| Manila | 29.73 | −.04 | 29.84 | 29 | 29.44 | 14 |
| Hong Kong | 29.75 | ..... | 29.89 | 13, 27, 28 | 29.59 | 6, 16 |
| Naha | 29.76 | .00 | 30.00 | 27, 28 | 29.32 | 6 |
| Chichishima | 29.80 | −.06 | 29.94 | 1, 11, 12, 27 | 29.28 | 24 |
| Nemuro [1] | 29.97 | ..... | 30.14 | 16 | 29.46 | 26 |

[1] Data for 21 days, well distributed over the month.

NOTE.—Data based on 1 daily observation only, except those for Juneau, Tatoosh Island, San Francisco, and Honolulu, which are based on 2 observations. Departures are computed from best available normals related to time of observation.

*Cyclones and gales.*—During the first third of September, only three days with gale winds of extra-tropical origin were reported from ships traversing the northern routes of the North Pacific. These winds occurred mostly near the Kuril Islands, and were of fresh to strong gale force only. The greater part of the storminess experienced in Japanese waters throughout September was due to three typhoons which moved well into northern latitudes. It was not until the very close of the month, on the 30th, that an energetic extra-tropical cyclone to the eastward of northern Japan caused the heaviest extra-tropical gale of the month, a wind of force 11, near 41° N., 149° E.

After the 10th of September the usual early autumn degree of storminess prevailed along the northern routes. This did not become at all pronounced, however, until the 18th to 20th, when gales of force 9 to 10 were experienced to the southward of the eastern Aleutians, within the region bounded roughly by latitudes 45°–50° N., longitudes 160°–170° W.

Two deep cyclones, with central pressures below 29 inches, passed over the Aleutians and vicinity during the last decade. The earlier reached its greatest intensity on the 23d to 25th and caused rather widespread storminess along the northern routes between about 145° and 175° W. No gales were reported, however, in excess of force 9. The latter cyclone reached its greatest depth on the 29th and 30th over the Bering Sea and the eastern Aleutians, and its highest wind-force, NW., 10, on the 30th, near 48° N., 176° E. The lowest barometer reading reported by a ship in northern waters this month was 28.59, read on the American Steamship *New York*, near 52° N., 169° W., on the 30th.

The record of further upper-latitude high winds of the month is found in the adjoined table of gales.

*Typhoons.*—Two very severe, and two lesser, typhoons occurred in far eastern waters this month. These are fully described in the subjoined article by the Rev. Bernard F. Doucette, S. J., of the Manila Observatory.

The weather in the American Tropics was quiet, the only gale reported being of force 7, on the 30th, south of the Gulf of Tehuantepec.

*Fog.*—Fog decreased materially along most of the northern routes, except near the American coast, since the preceding September, and was mostly observed on a few days during the first decade. With approach to American waters, fog increased over that observed in the previous month, and most generally was encountered during the latter half of the month. It was reported on 1 to 3 days in most of the 5° squares along the northern routes; on 9 days along the Washington and Oregon coasts; and on 12 days along the California coast.

## TYPHOONS AND DEPRESSION OVER THE FAR EAST, SEPTEMBER 1935

By BERNARD F. DOUCETTE, S. J.

[Weather Bureau, Manila, P. I.]

There are four typhoons to report for this month. Two of these typhoons were remarkable because of their irregular courses and also their great intensity, since they occurred almost simultaneously. Brief accounts of these disturbances are given below.

*Typhoon of September 1 to 12.*—This typhoon formed northeast of Guam on the 1st, moved west-northwest, changing to north-northwest as it approached the Nansei Islands on the 6th so that it passed between Naha and Oshima. It then recurved to the northeast, crossed southern Chosen (Korea) on the 9th and later continued on an easterly course across Japan and the one hundred and fiftieth meridian, where gales of force 9 accompanied the disturbance on the 11th and 12th. This typhoon had little effect upon the weather of the Philippines.

*Typhoon of September 10 to 19.*—This is the only typhoon of the month to cross any portion of the Philippine Archipelago. There was a trough of low pressure from Indochina across the Philippines to the Marianas 2 days before the typhoon formed.

Concerning the origin of this typhoon, the following notes give some idea of a complicated situation from September 8 to 12, during which time a persistent low-pressure area finally resulted in a definite depression to the north-northwest of Palau, which seemed to move toward the archipelago and then disappear just as another center formed (Sept. 11, 6 a. m.). The latter continued on a west-northwest course gradually changing to the northwest and then inclining to the west-northwest as it crossed central Luzon on the night of the 14th–15th. It passed a short distance north of Baler, Tayabas Province, and continued toward the Lingayen Gulf, moving west-northwest, and passing between Dagupan, Pangasinan Province, and Baguio, Mountain Province. The morning of September 15 found it moving northwest, but it changed quite suddenly to a west course

between 1 and 3 p. m. Moving west-northwest, then inclining west-southwest, it almost reached Indochina, but filled up south of Hainan Island on the 19th.

Barometric minima reported are as follows: Baler, Tayabas Province, had a minimum of 727.30 mm (28.634 inches) with west winds decreasing from force 12 to force 6 as the center passed north of the station. Dagupan, Pangasinan Province reported 739.38 mm (29.138 inches), the winds shifting from southwest, force 6 to north-northwest, force 8 as the center passed close to the city. The steamship *Mauban*, anchored at Bolinao, experienced a minimum of 738.0 mm (29.055 inches).

Very little rain was reported as this typhoon crossed Luzon. The damage inflicted was slight, and only a small number of places felt the terrible fury of the winds close to the center. Casiguran, Tayabas Province, was totally destroyed. Many families in Baler, Tayabas Province, were destitute after the typhoon passed. Over central Luzon, some roads and bridges were washed away by the rain which accompanied the storm. Two lives were lost according to reports in the newspapers.

Many ships in the China Sea gave valuable information to the observatory when the typhoon moved from Luzon into the China Sea. The steamships *Glenshiel, President Johnson, Benmohr, Tjisoraea* and *Empress of Asia* enabled the observatory staff to locate the typhoon very well. Observations from the steamship *Empress of Asia*, between 1 and 3 p. m., September 15, were of the greatest importance, because the typhoon changed its direction from northwest to west at that time. Captain Lovegrave skillfully handled his ship during these hours, bringing the vessel safely through a dangerous situation, the typhoon being between his position and Manila.

*Typhoons of September 14 to 27 and of September 22 to 27.*—Since these two typhoons occurred over partly the same interval of time, and because of the similarity of their tracks, the early irregularity of their progression, and their early acquired intensity, they are considered together. Without a doubt, they formed the main features of the weather situation over the Far East during the last half of the month.

Both typhoons originated in the neighborhood of Guam, one on the 14th, the other on the 22d. The earlier proceeded on an apparently irregular track for a few days, then generally west-northwest until the 22d, near longitude 128° E., latitude 23° N., when it recurved into north and northeast, crossed southwestern Japan on the 24th-25th, and on the 26th was central over the northern part of the Japan Sea, headed toward La Perouse Strait. The second typhoon, which began its northward movement near the northern Marianas about the 24th, was then central near longitude 146° E., latitude 21° N. On the 26th it lay east of southern Honshu, while its predecessor was over the Japan Sea. Thereafter both typhoons, still of great intensity, approached each other rapidly, and appear to have coalesced north of Hokushu on the 27th.

The loss of life in Japan due to these 2 typhoons was over 600, with 195 missing and 84 injured, as reported by Associated Press dispatches of September 27.

Many ships gave valuable assistance by their weather observations. Of these, the U. S. S. *Gold Star*, steamships *Ovington Court, Steel Traveler*, and the *Javanese Prince* must be mentioned. Also, the steamships *Fiscus*, the *Silverasp*, and the *Taian Maru* helped with their observations. Near the Archipelago, the steamships *Friderum, Muncaster Castle*, and *Tjimanoek* sent their observations showing that the typhoon was a very extensive storm.

During the second typhoon, the observatory is indebted to the steamships *Silvercypress* and the *Springbank* for valuable information.

The steamship *Ovington Court*, in the first typhoon, reported a barometric minimum of 27.68 inches September 18, 10 hours G. M. T. in the vicinity of latitude 19.00 N., longitude 139.30 E. Verification of these numbers is awaited. Winds of force 11 were experienced.

The motorship *Silvercypress*, in the second typhoon, had a minimum of 28.23 on September 25, with northeast winds of force 3–4 at 6 a. m. (one hundred and fiftieth meridian time). This occurred in the vicinity of latitude 25 N., longitude 144.50 E. The report of Capt. L. H. Hackett to the ship's owners shows the great diameter and intensity of the typhooon of September 22–27. Captain Hackett stated that he received a wireless report from a ship 240 miles to his southwestward during the forenoon of the 24th. The other ship at the time had a west-northwest wind, force 10, while the *Silvercypress* was experiencing an east by south wind of like force. It is regretted that the master's report is too lengthy to be published here in its entirety, with a description of his day and night endeavors to avoid the center of the storm, and of his final entry into the central area at 5:30 a. m. of the 25th. Here, said the report:

> Heaped-up, mountainous seas of unbelievable height at times observed higher than the crosstrees, came from different directions. * * * Myself and the chief officer witnessed two such seas collide with each other astern of the ship, one directly from the north and one from the south; a most interesting phenomenon. * * * Had one of these seas fallen on board the vessel I am certain it would only have been a matter of minutes before she foundered.
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> Visibility was no more than a quarter of a mile, and there was no light until 45 minutes after day should have broken. * * * The central area was left at 6:45 a. m., and within 15 minutes, the terrific force of north-northeast wind had completely flattened down all seas coming from other directions.

With the exception of the time occupied in the passage of the center, the ship experienced hurricane velocities from about 3 until about 8 a. m. of the 25th.

*Depression of September 27 to 30.*—A depression appeared north of Guam, moved north-northwest and recurved to the northeast when between the Bonin Islands and Japan. Apparently, it was of minor importance.